<u>REMARKS</u>

In the Office Action dated May 13, 2004, claims 4, 7, 8, 16-19, 33, and 41-50 were rejected under 35 U.S.C. § 103 over U.S. Patent No. 6,484,159 (Mumick) in view of Quass et al., "Making Views Self-Maintainable for Data Warehousing," 1996 (hereinafter "Quass").

It is respectfully submitted that a *prima facie* case of obviousness has not been established with respect to the claims for at least the following two reasons: (1) no motivation or suggestion existed at the time of the invention for combining the teachings of Mumick and Quass; and (2) even if combined, the hypothetical combination of Mumick and Quass fails to teach or suggest *all* elements of the claimed invention. *See* M.P.E.P. § 2143 (8th ed., rev. 2) at 2100-129.

The item (2) deficiency above is addressed first. A first point of error made in the Office Action is the statement that, with respect to claim 4, Mumick teaches receiving a first tuple into a base relation at a first node of a parallel database system having a plurality of nodes, where the base relation is partitioned across the nodes according to an attribute different from a join attribute. The Office Action cited to column 8, lines 5-9 and 15-21, as teaching this element. Applicant respectfully disagrees. The cited passages refer to computing first-level change tables and propagating the first-level change tables upwards to compute a high-level change table. The cited passages also refer to refreshing a higher-level materialized view by applying the higher-level change table to the higher-level materialized view. The cited passages also refer to some details of the refresh operation.

However, there is *nothing* in the cited passages, or anywhere else within Mumick, that suggests receiving a tuple into a base relation that is *partitioned across nodes of a parallel database system* according to an attribute different from a join attribute. In fact, Mumick suggests the complete opposite, describing a uni-processor system, as depicted in FIG. 1 of Mumick. FIG. 1 of Mumick shows one CPU 102 and one storage device 110. The storage device 110 of FIG. 1 contains a database having tables 114A, 114Z, materialized views 122A, 122Z and change tables 128A, 128Z. There is absolutely no indication whatsoever of distributing any of the tables and, in particular, the base tables

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114A, 114Z, across plural nodes of a database system. Even more particularly, there is absolutely no teaching or suggestion anywhere in Mumick of partitioning the tables 114A, 114Z across the nodes of a parallel database system according to an attribute different from a join attribute. Thus, the statement in the Office Action that Mumick teaches this first element of claim 4 is a factual error, which renders the obviousness rejection defective.

The Office Action conceded that Mumick does not teach storing the first tuple in an auxiliary relation at a second node of the parallel database system, where the auxiliary relation is partitioned across the nodes of the parallel database system according to the join attribute. Rather, the Office Action erroneously relied upon Quass as teaching the missing element. Although Quass teaches the use of "auxiliary views" in a database system for self-maintaining materialized views, the auxiliary views of Quass are not partitioned across the nodes of a database system according to a join attribute. In fact, no mention whatsoever is made of a parallel database system in Quass. Quass addresses a different issue than the present invention.

In Quass, the problem to be addressed is the avoidance of the storage of an entire base relation in a data warehouse. To do this, Quass proposes the use of an auxiliary view that "is never larger than the 'base relation' and may be much smaller." Quass, p. 161, column 2, lines 29-35. Thus, what Quass describes is the storage of an auxiliary view that is much smaller than a base relation in a data warehouse, where the auxiliary view can be used to maintain a materialized view. "When a view together with a set of auxiliary views can be maintained at the warehouse without accessing base data, we say the views are *self-maintainable*." Quass, p. 158, column 2, lines 31-35. Quass has nothing to do with partitioning a base relation and auxiliary relation across nodes of a database system in different ways, as recited in claim 4. Note that claim 4 recites that a base relation is partitioned across nodes according to an attribute different from a join attribute, while the auxiliary relation is partitioned across nodes of the database system according to the join attribute. Because Quass fails to teach the element of claim 1 conceded to be missing from Mumick, it is respectfully submitted that even if Mumick and Quass can be combined, the reference teachings fail to teach or suggest *all* elements of the claim.

Moreover, there was no motivation or suggestion to combine the teachings of Mumick and Quass. Whereas Mumick relates to the use of change tables (which is a compilation of updates that are to be performed to a materialized view) for performing materialized view maintenance, Quass relates to the storage of a subset of a base relation in a data warehouse, in the form of an auxiliary view, for performing materialized view maintenance. There is absolutely no suggestion of any need or desirability for the auxiliary views of Quass in the materialized view maintenance mechanism described in Mumick. Thus, what the Office Action has engaged in is a classic example of using impermissible hindsight to piece together unrelated elements of references in an attempt to achieve the combination of the claimed invention. Such impermissible hindsight reconstruction is clearly prohibited. Except for an arbitrary conclusory statement to piece together such unrelated elements, the Office Action has not provided any motivation or suggestion in the reference teachings themselves, or in knowledge generally available in the art, to combine the teachings of Mumick and Quass. The *prima facie* case of obviousness is defective for this further reason.

Withdrawal of the obviousness rejection of claim 4 is therefore respectfully requested. Independent claim 16 is allowable over the asserted combination of Mumick and Quass for similar reasons.

Independent claim 41 is also similarly allowable, since the hypothetical combination of Mumick and Quass fails to disclose storage *modules* to store base relations and at least a first auxiliary relation corresponding to a first one of the base relations, where the first auxiliary relation is partitioned across the storage modules *differently* than the first base relation. No such different partitioning of a base relation and an auxiliary relation across storage modules is taught or even remotely suggested by either Mumick or Quass. Moreover, as discussed above, no motivation or suggestion existed to combine the teachings of Mumick and Quass. Therefore, a *prima facie* case of obviousness has not been established with respect to claim 41.

Independent claim 42 is similarly allowable over the asserted combination of Quass and Mumick.

Dependent claims are allowable for at least the same reasons as corresponding independent claims.

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Allowance of all claims is respectfully requested. The Commissioner is authorized to charge any additional fees, including extension of time fees, and/or credit any overpayment to Deposit Account No. 50-1673 (9917).

Respectfully submitted,

Date: <u>August 11, 2004</u>

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